

National Aeronautics and Space Administration



# ***Engineering America's Future in Space: Systems Engineering Innovations for Sustainable Exploration***



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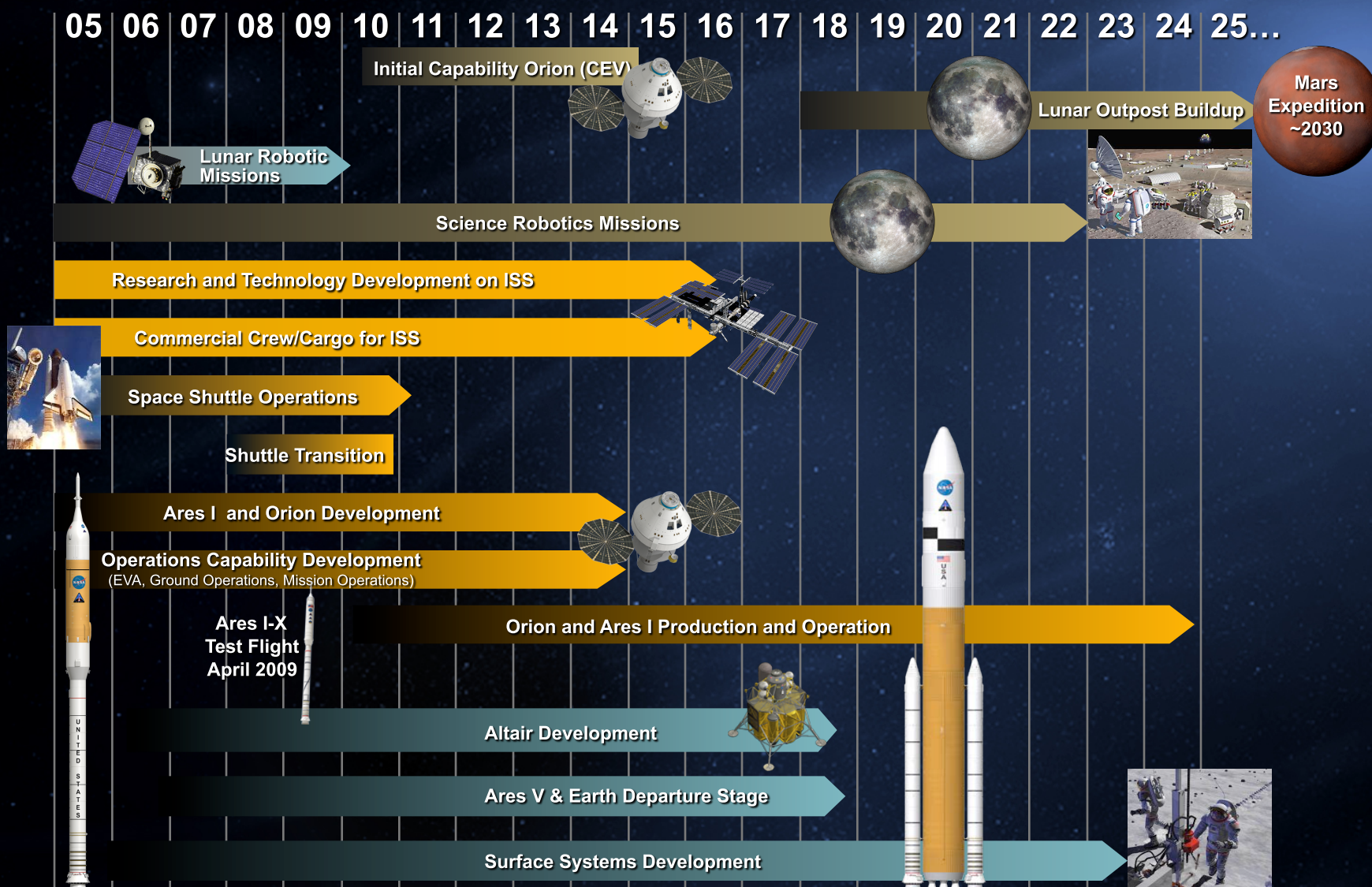
# Agenda

- **NASA's Exploration Roadmap**
- **Launch Vehicle Comparisons**
- **Designing the Ares I and Ares V In House**
- **Exploring the Moon**
- **Systems Engineering Adds Value Throughout the Project Lifecycle**





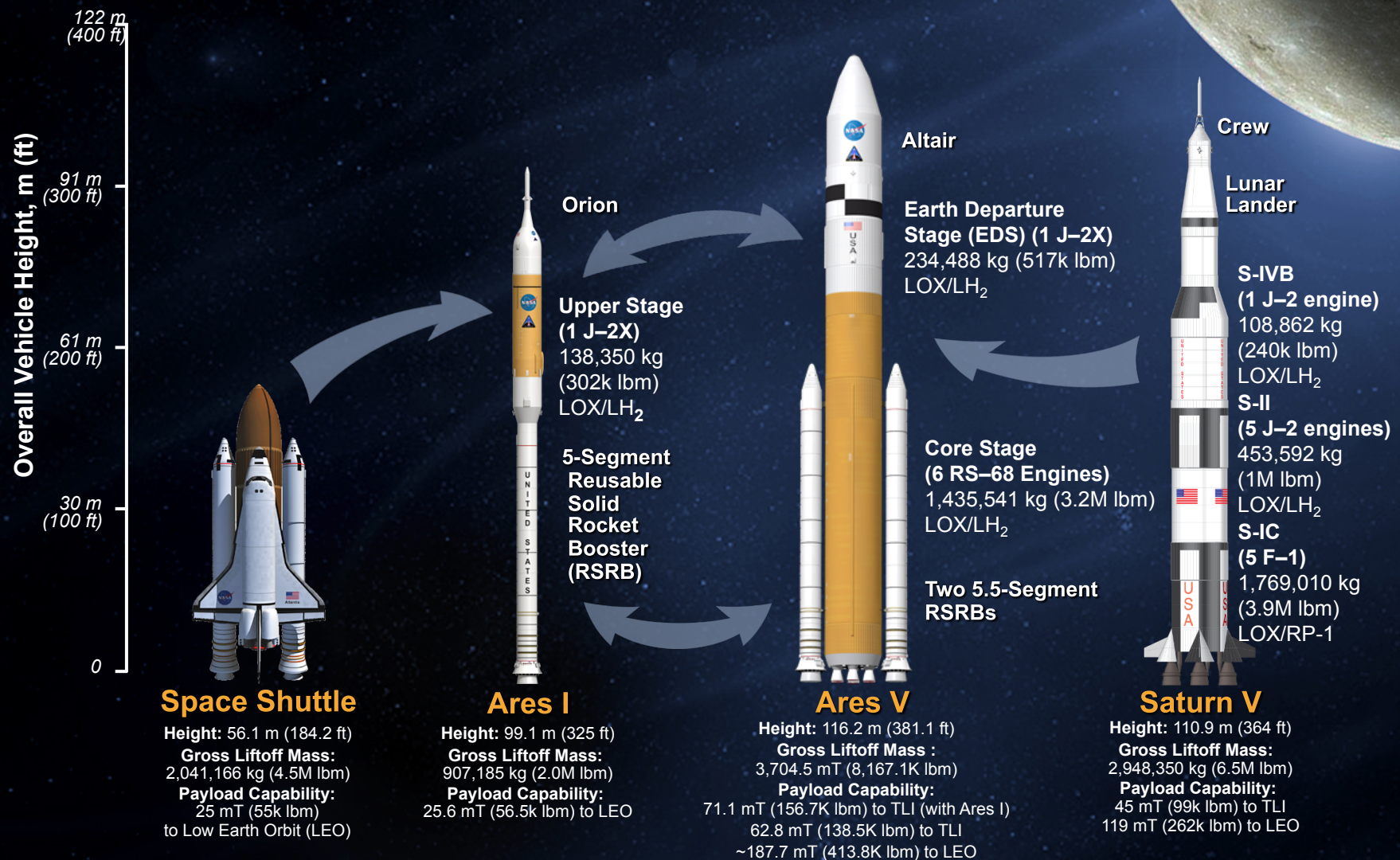
# NASA's Exploration Roadmap



*The Exploration Timeline Spans Several Decades*



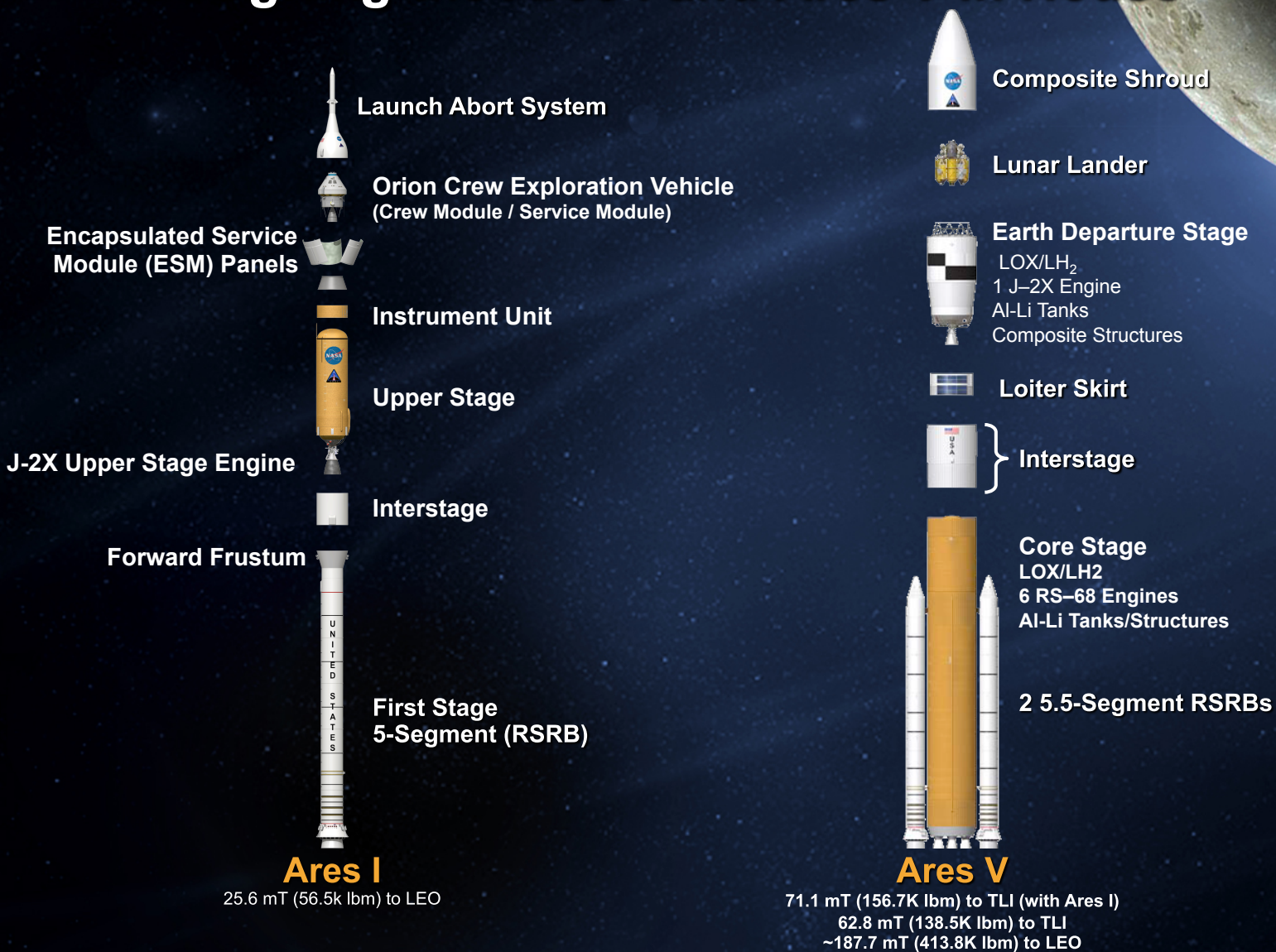
# Launch Vehicle Comparisons



***The Ares I and Ares V Build on Knowledge Gained from the Saturn V and Space Shuttle***



# Designing the Ares I and Ares V In House



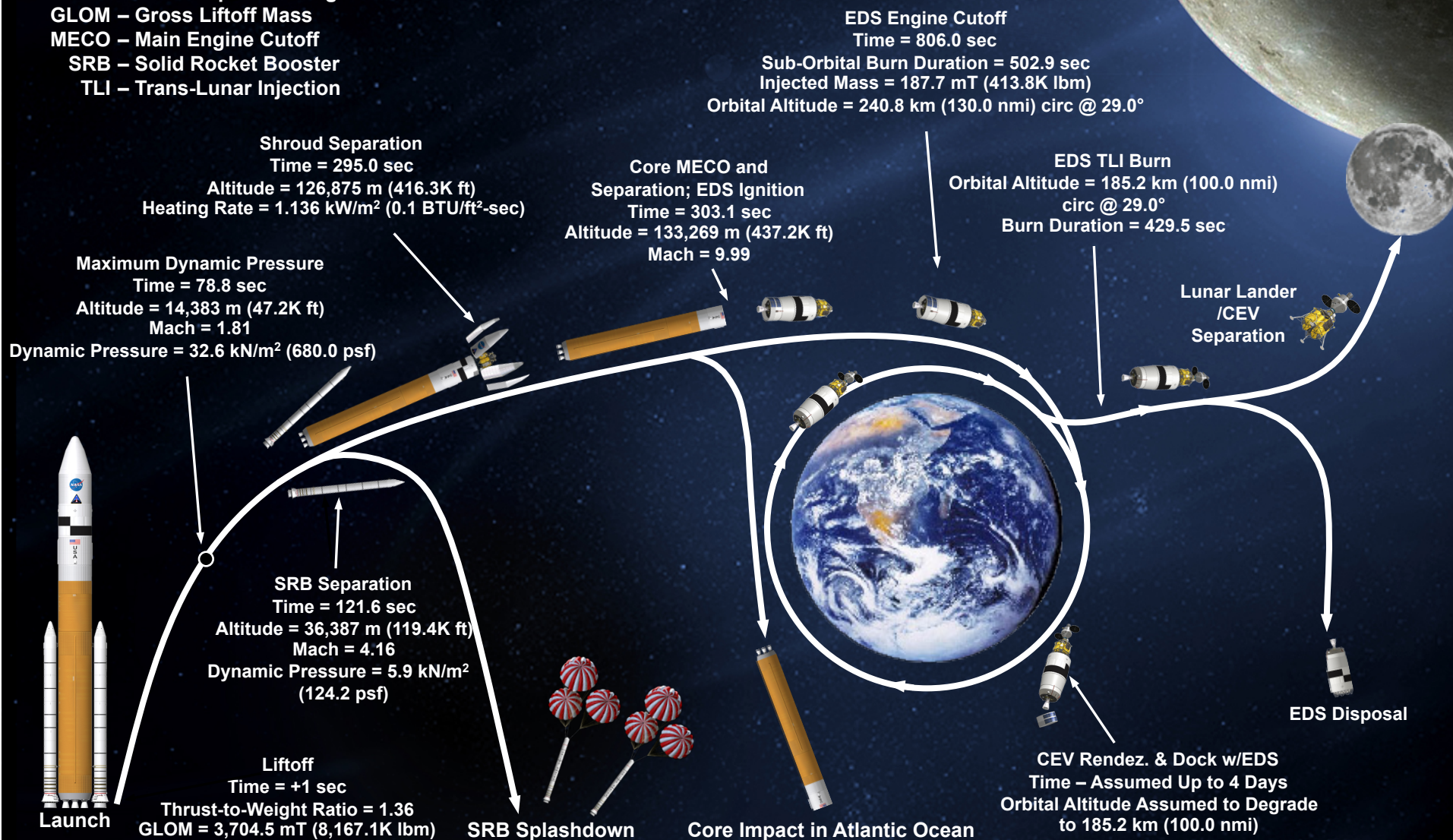
*Engineering Lessons Apply to Both Systems*





# Exploring the Moon

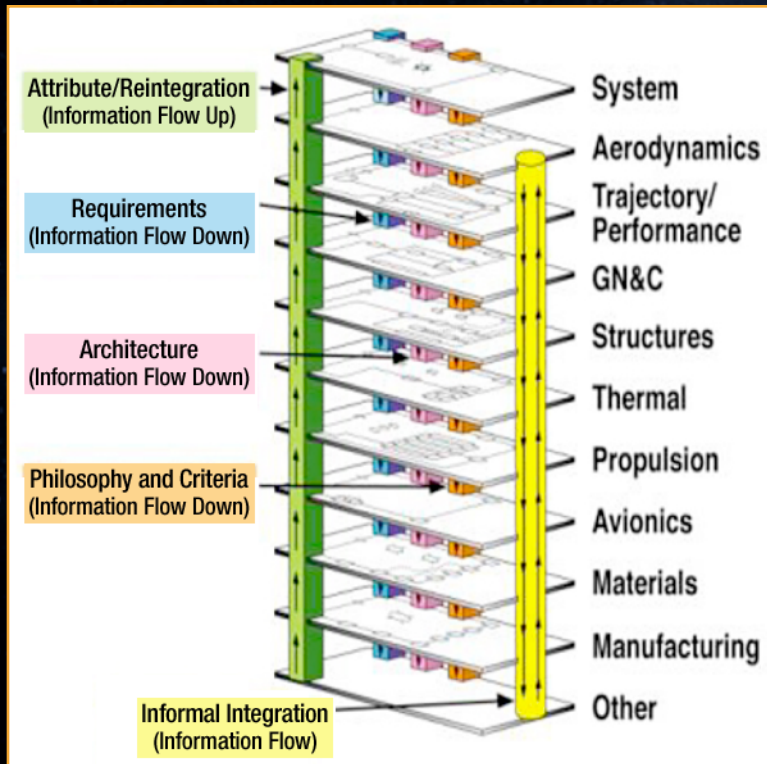
CEV – Crew Exploration Vehicle  
EDS – Earth Departure Stage  
GLOM – Gross Liftoff Mass  
MECO – Main Engine Cutoff  
SRB – Solid Rocket Booster  
TLI – Trans-Lunar Injection



*Preparing for the First Astronauts on Mars*



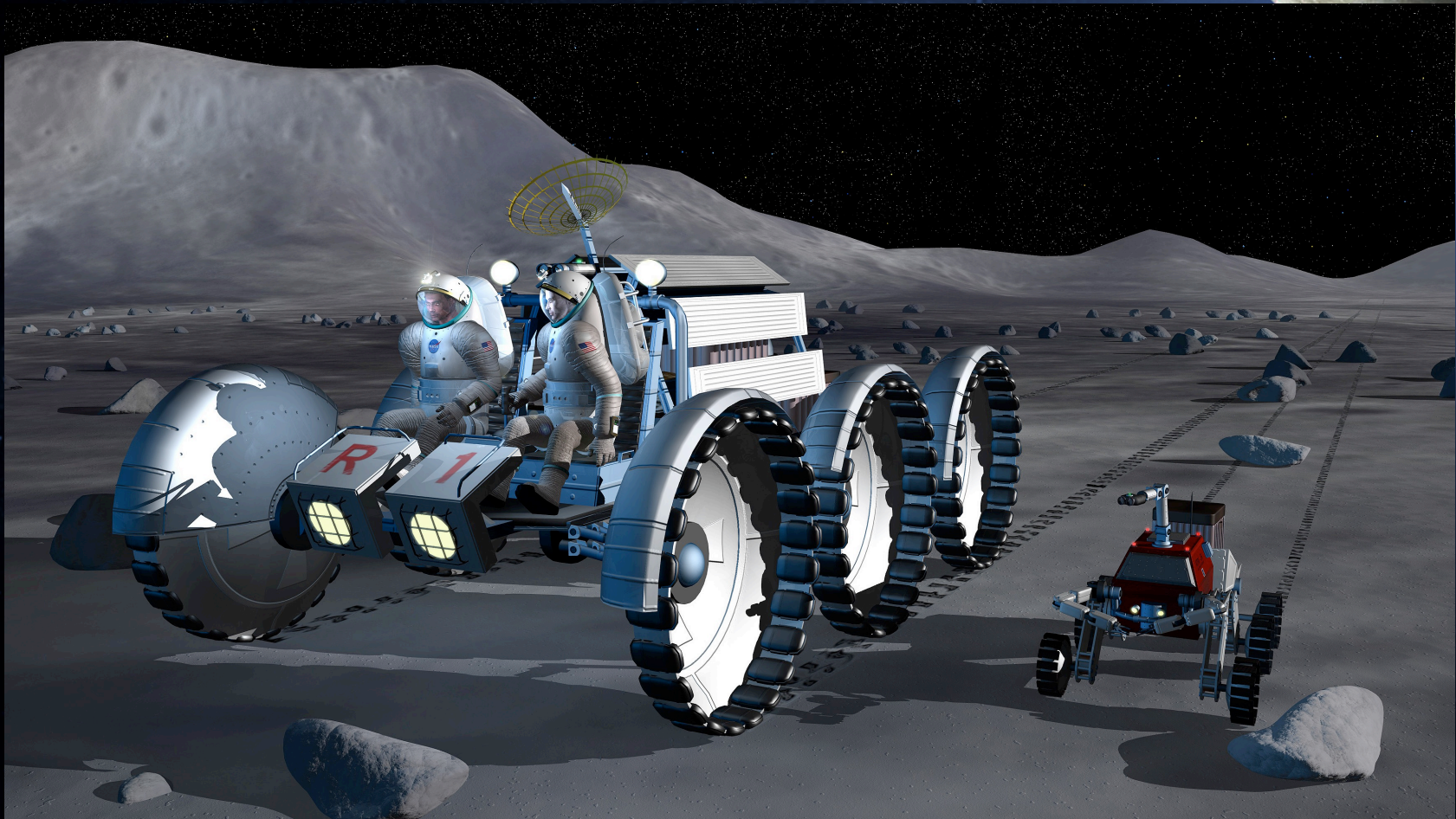
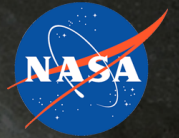
# Systems Engineering Adds Value Throughout the Project Lifecycle



*Integrating Vertically and Horizontally*



# For More Information



[www.nasa.gov](http://www.nasa.gov)